|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | **Observations** | |  |
| **Sample** |  | **1** | **2** | **3** | **4** |
|  |  |  |  |  |  |
| 1 |  | 4.92 | 5.54 | 5.00 | 5.42 |
| 2 |  | 4.65 | 5.14 | 4.26 | 4.71 |
| 3 |  | 5.78 | 5.50 | 5.05 | 4.79 |
| 4 |  | 5.95 | 3.83 | 4.30 | 4.44 |
| 5 |  | 4.92 | 4.80 | 4.75 | 5.59 |
| 6 |  | 5.68 | 5.74 | 4.65 | 4.65 |
| 7 |  | 4.78 | 5.79 | 5.20 | 4.70 |
| 8 |  | 4.43 | 4.81 | 5.27 | 4.87 |
| 9 |  | 6.04 | 4.47 | 5.18 | 5.41 |
| 10 |  | 4.96 | 5.18 | 5.48 | 4.73 |

1. The Jackson Machine Company has four cutting tools that need to be refurbished after an average of 30 hours, according to an exponential distribution. The single machine that refurbishes the tools needs 15 hours for each tool on the average, with exponential service times. Please find the following. Please show your work in detail.

a. What is the probability that there will be no tools in the system?

b. What is the average utilization of the refurbishing machine?

c. What is the average waiting time of tools in line?

d. What is the average number of tools in the waiting line?

e. What is the average time spent in the system?